ART. III.—*Report on Scorbutus, as it appeared on board the United States Squadron, Blockading the Ports in the Gulf of Mexico, in the Summer of* 1846. By J. M. FOLTZ, M. D., Surgeon U. S. S. Raritan, Late Fleet Surgeon, Brazil Station. [Transmitted to the Bureau of Medicine and Surgery, and communicated to this Journal by THOMAS HARRIS, M. D., Chief Bureau Med. and Surg., U. S. N.]

SCURVY occurred in a most aggravated form, on board a large portion of the squadron blockading the coast of Mexico, during the summer of 1846, and for some months disabled several of the largest and most efficient ships, at a time when their services were required to operate against the enemy. The frigates Raritan and Potomac, corvettes Falmouth and John Adams, the Flirt and the steamer Mississippi, suffered severely, and a few milder cases occurred on board most of the other ships. The disease assumed the most formidable aspect, and prostrated the greatest number of men on board the frigate Raritan and the corvette Falmouth. On board the Potomac, of fifty guns, with a complement of 500, officers and crew, recently placed in commission, and commanded by one of our most energetic and indefatigable officers, the disease appeared in August, assuming so severe a form, that she was compelled to proceed to Pensacola with more than 100 cases upon her sick report, and with symptoms of the disease in most of the crew who still continued to perform their duty. After remaining two months in port, the disease had so far diminished as to enable her to return to her cruizing station off Vera Cruz, where, by a supply of fresh provisions, the crew were restored to good health. The Potomac had a new crew, had recently been in dock—thoroughly cleansed and coppered, and for internal police and cleanliness, was unsurpassed by any ship in the service; yet the scurvy early made its appearance in this vessel, and spread rapidly. The cause of the disease can be clearly traced, and will be pointed out in the proper place.

The Falmouth had been commissioned two years, and had passed this time in the Gulf, and among the West India islands. This ship is well ventilated, and her crew enjoyed good health until invaded by the scurvy. Their long sojourn in an intertropical clime, had prepared them for the reception of the disease, and, like the crew of the Raritan, who had suffered by a similar enervation, when scurvy once occurred, it spread rapidly and was malignant in character. The Falmouth was ordered from Pensacola to Boston, as her crew were completely prostrated, and during her passage round, her only surviving medical officer, Dr. Nelson, represents the condition of the sick and dying as most deplorable. The crowded state of the sick cots and hammocks, the fetor from the ulcers, and the distress of the dying, all contributed to accelerate the course of the disease in those who were already down, as well as to induce it in the few who were still able to perform a small portion of the necessary duty.

The Mississippi steam frigate had been but little at sea. She had been eighteen months in commission: by using steam, her passages at sea were short, and in our protracted and vexatious negotiations with Mexico, during the rejected mission of Mr. Slidell, she was used as a dispatch vessel, making her passages between Pensacola and Vera Cruz in from four to six days, and passing four-fifths of her time in port, where she was abundantly supplied with fresh provisions and vegetables. Yet here the cause, we

think, can be clearly and satisfactorily traced. The number of cases was limited on board the Mississippi, and was confined to the commencement of the present war.

The frigate Raritan, of fifty guns, had the greatest number of cases, and was the longest time placed "*hors de combat*" by the scurvy. We served on that ship for more than three years, treated all the cases, and it is to the rise, progress and character of the scurvy, as it appeared on board that ship particularly, and incidentally in the squadron, which we propose briefly to investigate, confining our observations to the bounds of "a report."

The frigate Raritan was placed in commission for the first time, on the 15th November, 1843. Although a new ship in commission, she had been twenty-one years on the stocks; her model was considered one of the most perfect; which opinion her subsequent sailing qualities confirmed. But her internal arrangements, with the accommodations for officers and crew, were all of the very worst character. The hold is exceedingly small, badly arranged, and imperfectly ventilated. The berth-deck is low, with very small air-ports, arranged on the old principle, only allowing to be opened in port, when at anchor, and in the best weather, with small, dark and contracted apartments for the gun-room and warrant officers.

The hatches leading to this deck are small, and so arranged that windsails cannot pass in a perpendicular line from the spar-deck to the berth-deck or hold. The ventilation is therefore very imperfect, and those who are compelled to pass much of their time below, are deprived of light and air.

The sick-bay in the bows of the ship on the berth-deck, and the cockpit, where a mess of officers were living between the tropics, where the thermometer seldom fell to 80°, were both without light and air; apartments which, above all others in the ship, should be abundantly supplied with both. The wardroom was low, dark and dismal, crowded by a mess of fourteen, and lighted by a hatch four feet by three.

We reported for duty before the ship was placed in commission. Upon examination we found that the sick bay was very small, and without a hatch even for the admission of a windsail. The following report was made to the captain, requesting the removal of the sick-bay bulkhead aft, so as to enlarge the bay, and admit light and air into the apartment designed for the use of the sick, which were so essential to their comfort and recovery.

U. S. S. Raritan, 21st. Nov., 1843.

Sir:—The crew of this ship have recently suffered much from pulmonary inflammation, incidental to the season, and in several of them the disease has assumed a most aggravated form. Thirty-one are at this time upon the sick report, and at the Hospital. I am convinced that the severity of the disease in some cases, is owing to the unusually contracted and small space allotted for the sick-bay. In all other frigates, the sick-bay bulkhead is abaft the scuttle for the fore passage. On board this ship it is forward, which not only allows a space quite too small for the sick, but precludes the possibility of admission of light or air.

I would therefore report, as necessary for the health of the ship, and to accelerate the recovery of those who may be ill, *that the bulkhead of the sick-bay be removed abaft the fore scuttle.*

I am, very respectfully, yours, &c.

J. M. Foltz, Surgeon U. S. N.

Captain F. H. Gregory, Commanding U. S. S. Raritan.

This report was transmitted to the proper authority, and the request for an alteration denied, on the grounds that it was unnecessary, and that the present arrangements are good.

On the 30th November, 1843, the Raritan left the Navy Yard at Philadelphia for New York, the ice in the Delaware rendering her departure necessary. There were but 150 officers and men on board. Six days were passed before we reached the Capes of the Delaware; off New York we encountered severe northwesters, with snow and sleet, and we did not reach the Navy Yard at New York before the fifteenth day. The weather was extremely cold during the passage, and when we reached the Navy Yard, the thermometer was down to zero. A bridge of ice soon bound us to both shores. The winter of 1843 and '44 is remembered as one of our coldest seasons, and for a long time after our arrival we were without fires.

Exposure of the crew to the severe cold, and the necessary labor of fitting out ship, kept the number of sick large. Pneumonia and fever of a typhoid type were the prevailing diseases; and all efforts to procure stoves for the ship proved unavailing, until Captain Gregory wrote to the Department, that, "unless stoves were speedily furnished, it would cost the Government more for coffins than for stoves and fuel!" The return mail brought orders to have the ship warmed.

Small-pox made its appearance about this time, and these cases, together with those down with typhus, all exhibited the influence of the vitiated condition of the air on the lower decks of the Raritan, and many of the cases of fever were so bad, that Dr. Ruschenberger, the Surgeon of the Hospital, was apprehensive of its assuming the form of an epidemic; generating in the vitiated atmosphere on the crowded, confined, and imperfectly ventilated decks of the ship.

On the 20th February, 1844, we sailed from New York for Rio de Janeiro. A few days carried us into the Gulf Stream, and in three weeks, we were near the Cape de Verd Islands, where we enjoyed warm sun, pleasant weather, and soft breezes.

How much suffering and disease, and how many valuable lives could be spared, if our ships of war were fitted out in the autumn or spring, instead of midwinter! or, should it be necessary, in time of war, to place our ships in commission in winter, humanity would at least demand that they should be fitted out in a southern port. At Norfolk, our winters are never long or severe; but north of that, ice and cold, and hard labour, have destroyed the life of many a sailor who was proud to serve under his country's flag, and to do the state service; who, labouring in the merchant service, at the same season, would have remained in health and vigour. When a merchant ship is alongside dock, her sailors are near warm rooms and comfortable fires. On board our ships of war it is not so. Cold, damp ships, kept wet in winter, to be kept clean! are the home, night and day for weeks and months, of the sailor. Spirit, which is now abolished from the merchant service, is given to keep him warm, and fuel is thus thrown into the flames which are sure to destroy him. After sixteen years' experience in the navy, during which I have served in all climates and upon all stations, I can say that I know of no means calculated to do so much good to the sailor, both morally and physically, as *the entire abolition of the spirit-ration in the navy.* A large mass of sailors, habitual drunkards, and most of them foreigners, are now to be found on board our ships of war, who come there solely because they are unable to procure their lot of grog on board merchant ships. Intemperance, agreeably to my experience, has increased, instead of diminished, in the navy, from the cause mentioned above. It is to be hoped that early legislation will correct this evil.

Intertropical temperature, repose of some months in the harbour of Rio

de Janeiro, and bringing the ship, her crew and officers, into the discipline, order, and regularity which characterize a ship of war on her station, restored the ship to a most perfect state of health. This continued uninterruptedly so long as we remained on the South American station. The average number upon the daily sick report for two years, did not exceed nine, and frequently for weeks together, ranged as low as five. The Raritan visited Bahia and St. Catharine's, and passed many months at Monte Video, at which place the seeds of the disease were sown which we have at present under consideration.

Monte Video had been under a siege of the combined Argentine and Oriental troops, under the command of Ex-President Oribe, while Admiral Brown kept up the blockade at sea, with the Argentine squadron. This siege and blockade deprived the town of almost all necessaries of life; and meats and vegetables could only be procured with the greatest difficulty, and in the smallest quantities, for the foreign ships of war; of which a large number were present, observing the progress of the war.

In July, the combined English and French fleets took possession of the Argentine squadron, established a vigorous blockade of Buenos Ayres, and prohibited all intercourse with the army of Oribe investing the city, from whom the limited supplies, previously furnished to the ships, were procured.

The Raritan, during her last two visits to the Rio de La Plata, was compelled to subsist all hands upon the salt rations exclusively. This subsisting upon salt provisions continued uninterruptedly from the time of leaving Rio Janeiro until our return to that port; nor was this living confined to salt provisions alone, but was accompanied, at times, by the use of the water of the river, taken from alongside the ship; which, notwithstanding it was freshened by violent pamperos, yet contained some saline matter. The quality of the water was not only impaired, but the quantity was at times reduced. On the occasion of these visits, the exigencies of the service were such, that the ship could not return to Rio, where the public depot of stores is kept, to replenish; and many of the most essential articles in the government ration were exhausted; and bad beef, bad bread, and bad water, the latter in limited quantities, were the provisions on which both officers and men were compelled to subsist.

The number of sick augmented monthly from these causes, combined with the enervating effects of a hot climate. There are but few places in the world where the thermometer has a higher range throughout the year than in Rio—and nowhere are the summer months (December, January, and February), more oppressive. From the records of twenty years' observations, the mean annual temperature is 79°, that of the summer, 86°.

The imperfectly ventilated condition of the lower decks during this protracted hot weather, with the vitiated condition of the atmosphere, induced by the bilge water and crowded decks, contributed to augment the tendency to disease induced by salt food.

Recommendations were sent in, to enlarge the wardroom-hatch, so as to admit light and air. Our minister at Rio Janeiro, Mr. Wise, who has in all positions taken so active an interest in the prosperity and condition of the Navy, was so forcibly struck with the imperfect arrangements on board the Raritan, and of the oppressive condition of the air on her lower decks, that he, unsolicited, used his personal influence with the Commodore to have these hatches enlarged. The following is a copy of our recommendations for this alteration:

U. S. S. Raritan, Rio de Janeiro, Oct. 8th, 1844.

Sir:—We, the undersigned, Wardroom Officers of the ship, respectfully ask to call your attention to the condition of the wardroom of this ship.

This apartment, in which thirteen officers and their servants are obliged to live, is almost entirely without light and air, and at sea, when the air-ports are caulked in, is almost uninhabitable.

The only hatch to the wardroom is covered by the spar deck, and is but four feet one inch in length, and three feet wide. We are under the necessity of using candles at all our meals, and we at all times suffer from want of ventilation.

The warm weather now approaching, will render this apartment insupportable. We therefore respectfully, but urgently, request, that you will be pleased to have the present hatch extended to the hatch leading into the steerage, which would give us light and air.

We are, respectfully, &c.
(Signed by all the Wardroom Officers.)

To Com. Daniel Turner, Commanding U. S. Squadron, Brazil Station.

U. S. S. Raritan, Rio Janeiro, Oct. 8th, 1844.

Sir:—I respectfully recommend the above alteration, as necessary to the preservation of the health of the officers and crew of this ship.

I am, respectfully, &c.
J. M. Foltz, Surgeon of the Fleet.

Com. Daniel Turner, Commanding U. S. Squadron, Brazil Station.

Commodore Turner was fully convinced of the importance of this change, and was most desirous to have it effected; but the orders from Washington, upon the subject of any alterations in the interior of ships, are so stringent, that he was unable, without a direct disobedience of orders, to carry his own and our wishes into execution.

These inconveniences were all submitted to with the utmost cheerfulness. Officers and crew combined to make a "jolly cruize," and few men in life pine less over cares, inconveniences, and misfortunes, than those whose life is passed upon the deep.

The Raritan had been fitted out for a two years' cruize, that being the time limited by the Department; and these two years had now nearly terminated.

On the 3d of February, 1846, we sailed for home, via the West Indies, with the sick and invalids of the outward bound East India and Pacific squadrons, on board; and, after a monotonous and tedious passage of 43 days, we reached Pensacola, where the sick were transferred to the hospital. The number of sick, during the passage home, was large, notwithstanding the cheerfulness of the crew. All on board were predisposed to disease, by the two years' confinement to the ship and hot weather we had just gone through.

At Pensacola, light hearts and smiling faces were changed by bitter disappointment.

The Raritan was ordered, with all possible dispatch, to proceed to Vera Cruz, in consequence of our difficulties with Mexico. In a few days, Captain Gregory reported to Commodore Conner, and we now constituted part of his squadron.

There was no intercourse with the town, and all hands were again restricted to the use of salt provisions. The crews of the squadron were frequently exercised at their guns, and the crew of the Raritan, who were perfect at their quarters, and made so by much practice, were kept as long at their labour in the hottest weather as the crews of ships recently placed in commission, and who had much to learn.

May 4th, the squadron sailed to render assistance to General Taylor, who, the Commodore had learned, would be attacked by the Mexicans. We reached Point Isabel at daylight on the 8th, and immediately proceeded to land seamen and marines to assist in the defence of the place. In four days the force re-embarked, the enemy having retreated with precipitation after their disastrous defeats on the 8th and 9th. On the 17th May, the Raritan sailed for Vera Cruz, with orders to enforce a strict and vigorous blockade upon all the Mexican ports, as far south as Alvarado. These orders were enforced, until the Raritan was compelled, by the prostration of so many of her crew with the scurvy as to disable her, to proceed to Pensacola.

During the month of April, a large number of the crew were admitted upon the list with rheumatism, the pains being chiefly confined to the lower extremities. After some days, the subjects of these cases became affected with swollen and bleeding gums, great fetor of the breath, and maculæ and the purpura scorbuticæ,which were not confined to the extremities, but also invaded, from the commencement, the body and face. These symptoms at once revealed the true character of the disease, and we found that scorbutus had seized upon us, in a form unknown in our national marine since our last war with Great Britain.

The increase in the number of cases was very rapid, from eight to ten new ones being daily admitted on the sick report; and by the 1st of June, sixty cases had been under treatment. A liberal use of the acids on board ship, with a small supply of fruits, procured through the kindness of the British and French squadrons, speedily gave relief to the patients under treatment; but the new cases daily presenting, kept up the number of sick, and gave the disagreeable assurance that the whole crew were contaminated; and that nothing but a liberal supply of fresh provisions could avert the evil.

During the month of June, nearly one hundred new cases reported for treatment, while most of those who were first seized, and were temporarily relieved by treatment, returned again to the sick bay with a new class of symptoms, presenting the disease in a more aggravated form than it had first assumed.

A report was submitted requesting a medical survey upon the condition of the crew, and recommending that we should proceed to some convenient port for fresh supplies, fruits and vegetables.

The surgeon of the fleet made this survey, and concurred in the recommendation.

1st of July, the Raritan sailed, in compliance with this recommendation, to the River San Martin, sixty miles to the southward of Vera Cruz, where, it was represented, all the necessary supplies could be readily procured. Good and pure water was found in abundance, but this was the only article we could get. The few natives who reside in the forest near that part of the coast, kept themselves carefully concealed, and while watering ship we were not able to open any intercourse with them. By the 10th of July, we again joined the fleet before Vera Cruz, with the scurvy raging in a much more aggravated form than when we sailed. Those under treatment had grown much worse, for the want of proper remedies, while the increased labour and exposure of the crew in watering ship on an open coast, developed many new cases in its worst forms.

The Raritan, which had been so efficient a ship for two years, beating all other ships of war in reefing, furling, and in all her evolutions, with her

efficient and powerful crew of young men, was now barely able to navigate the ocean. For all purposes of war she was placed "*hors de combat.*" More than two hundred cases of scurvy were under treatment, and but few of those who were on duty were free from all symptoms of the disease. The character of the epidemic was directly opposed to other epidemics which we had encountered in the malignant disease met with in other parts of the world.

The infirm and broken-down landsmen, boys who had never been to sea before, and the marines, whose constitutions and habits had not yet been inured to the vicissitudes, exposures and privations of sea life, are, in the East Indies and on the coast of Africa, the first to suffer, while the robust and hardy seamen enjoy a comparative immunity. The scurvy, in its devastations on board the Raritan, reversed its march. The more vigorous, robust and plethoric the constitution, the more industrious and active the man's habits, in the same ratio were the liabilities to the attack, and the violence of the disease. At a time when the sick report was comparatively small, the most efficient of the crew were disabled, embracing those whose services could least be dispensed with, and whose duties were but imperfectly performed by others. These were the captains of tops, quarter-gunners, quarter-masters, boatswains' mates, the holders, and the strong and iron-framed seamen of the forecastle.

A large majority of these men had never been on the sick report during the cruize, and when first seized, attributed their pains to slight catarrhs, and did not, from a laudable ambition to do their duty, report themselves, until the disease was far advanced, and they were completely disabled. If there was any class of the men specified above who suffered more than the rest, it was the holders; not one escaped symptoms of the disease, and the first and second captains of the hold were among the worst cases. Both narrowly escaped with their lives, and for weeks it was doubtful if they would live from day to day. When this class of the ship's company found themselves racked with pains, covered with ulcers, and daily sinking, from being subordinate and obedient, they became the most clamorous and unruly. Many of them had fulfilled their part of the contract with the government. Their three years' service, for which they had shipped, had expired; they had seen much arduous service at sea; and they were now suffering from a disease which could only be cured by returning to port, where they desired to be discharged.

Another medical survey was called; and held by the fleet surgeon, by orders of the commodore. The report recommended that the ship should proceed to a northern port without delay. On the 17th July, the Raritan sailed from Vera Cruz for Pensacola, with more than two hundred cases of scurvy on board, and a large number of the crew with premonitory symptoms, who remained on duty, assisting in the navigation of the ship.

On the 24th, arrived at Pensacola, and eighty of the worst cases were immediately transferred to the U. S. Naval Hospital on shore. Fresh meats, vegetables, and fresh bread were freely served out to all hands, and so soon as sufficiently well, liberty was given to them to have a run on shore; all rapidly improved on board, and by the 15th of September the Raritan again put to sea, enabled to resume her duties in blockading the enemy's coast.

Symptoms.—The premonitory symptoms were almost as various as the number of cases. As we have already observed, the first cases were admitted upon the report with rheumatism. The lassitude and indisposition

to muscular exertion, which ordinarily usher in this disease, did not occur—there was a disposition to labour, frequently indulged to such an extent as to add to the severity of the disease. The pains were confined chiefly to the lower extremities and their articulations; were constant;—not presenting the usual exacerbations at night which ordinarily characterize rheumatism,—neither were they accompanied by pyrexia. The pulse was soft and natural, respiration easy; but the temperature of the cutaneous surface was below the normal standard.

The next symptoms in the order in which they presented, were sponginess and bleeding of the gums, with ulceration, which in some cases advanced so rapidly, that the teeth fell out early in the disease. There was great fetor of the breath, and ulcerations of the mucous membrane extending into the fauces. The inability to masticate, and the want of adaptation of the only food remaining (salt provisions) to the cases, induced rapid emaciation and exhaustion; and, it was not until then, that languor and lassitude took such complete possession, that the sick were incapable of making the slightest muscular exertion. This prostration was accompanied or speedily followed by great difficulty in respiration, as if there was a heavy weight on the chest, which produced, on an effort to move or converse, a sensation of faintiness or suffocation.

Œdema of the lower extremities was next in order of frequency; commencing at the ankles, it gradually extended, and in some cases there were puffiness in the face and general anasarca. Deep pits would frequently remain after pressure over the course of the tibia, before there were any indications of effusion to the eye. In one case, the captain of the mizen top, a young and active man, it terminated in ascites, from which he died at the Pensacola Hospital; and hydrothorax was the termination in a number of the invalids.

Where œdema existed, the countenance was bloated, and had a dull, lead-coloured appearance. The skin was cold and clammy to the touch, the urine was scanty and turbid, the alvine dejections small and irregular; while the patient complained much of pain and uneasiness in the bowels. In the milder cases, among that portion of the crew who remained on duty during our passage to Pensacola, almost universal œdema appeared. It was a common practice among these men, to amuse themselves by collecting in groups, and trying upon their own limbs who could make the deepest indentation with their fingers; and he whose indentation would be deepest and remain longest, while yet on duty, was considered the hero among his shipmates. Such are the expedients that sailors resort to at sea to sustain each other in an emergency, and to find amusement in their many weary hours! These effusions were among the first symptoms to disappear under treatment, or after our return to port; yet, upon a suspension of medicines and fresh diet, they would invariably return, in an aggravated form, and accompanied by other symptoms.

Macula or purpura scorbutica was, next to œdema, the symptom in order of frequency, while in the order of severity it should stand first in the catalogue. Deep brown and liver-coloured blotches, varying in size from the point of a finger to the whole extent embraced from the knee to the foot, or involving the whole of the inside of the thigh, were found in many cases on the patient reporting sick. This effusion of decomposed blood in the cellular tissue, sometimes presented the appearance of small petechia or flea-bites extending almost over the entire body. It was unaccompanied by itching or pricking. Urticaria had been very prevalent on

board ship since our arrival in the Gulf, among both officers and men; in many it was so severe that it prevented sleep for many nights in succession, but was not attended by any other disagreeable symptom. In no case did this nettlerash produce any aggravation of the scorbutic maculæ, so far as we could trace their existence in the same individual.

These maculæ did not always appear first on the inside of the lower extremities. The arms and face were not unfrequently the seat of the invasion, while the chest was the last to suffer. In one case, a petty officer, the captain of the maintop, presented himself with his face exhibiting the appearance of having been washed with diluted ink, or some dark colouring matter. My attention was called to the case by Dr. Potter, the medical gentleman on duty with me. The patient, Johnson, felt perfectly well, had performed his duties aloft all day, drank his grog, and still felt well enough to go aloft. For ten days his feet had been swollen, and his gums sore, bleeding upon slight pressure, but his energy and spirits had never flagged, and he had only reported to the doctor because he had suddenly turned "bloody black" in the face. He was cheerful, and desired much to return to his duty, which was not allowed. The following day he was a prisoner to his cot; the purpura appeared on the extremities, the gums and mouth were much worse, while severe pains racked every joint and limb.

This discoloration extended in several cases from the groin to the tip of the toes, involving almost the entire surface. In one, which will be noticed more at length, both lower extremities assumed an almost black appearance; the feet and legs became hard, indurated, and almost insensible to the touch, threatening that species of dry gangrene frequently met with in the hospitals of Europe, but which we have never encountered in this country. This patient exhibited from the commencement a pale and sallow aspect, was languid and exhausted, and incapable of any corporeal exertions. This discoloration of the skin was first to show itself in old cicatrices and injuries, and in the worst cases, these were disposed to ulcerate. These cicatrices were also the last to return to a healthy condition, retaining the evidence of the disease, long after the adjoining tissues had lost every trace of it. The colour varied much in different cases, from a light scarlet erythema to that of deep purple, almost black.

Purpura frequently presented itself in cases unaccompanied with other symptoms, where the individual was still able to perform some duty; but all those cases subsequently assumed a more grave and severe character, and required a more active and prolonged course of treatment, than in such cases where this symptom was not encountered.

Ulcerations were not very frequent, but where they did occur, or had already existed, they in every case proved extremely obstinate and intractable. They assumed a rapid disposition to extend, accompanied with a copious discharge, at times very offensive, and having an indolent and flabby surface, which all local applications failed to change into a granulating surface. Where these ulcers occurred in cases with cutaneous discoloration, they invariably assumed the worst aspect, spread with great rapidity, burrowed deeper, discharged more copiously, and not only were more difficult to heal, but also, by the drain which they opened to the system, accelerated the approach of collapse, from which recovery was difficult.

The slight petechiæ mentioned above were in some cases converted into small ulcers, which ultimately spread and ran into each other, occasioned by the patient irritating and scratching them, though they did not itch.

Nyctalopia occurred in five, and hemeralopia in two cases. One case of

the latter was so bad, that the patient could not move about the even decks, with which he was perfectly familiar, without the greatest difficulty. There were other affections of the eyes, owing obviously to this scorbutic diathesis, such as inflammation of the conjunctiva, induration and irritation of the ciliæ, accompanied with a copious acrimonious discharge. The usual collyria were used without any benefit, and the eyes improved or became worse, in proportion to the arrest or progress of the scurvy; and ultimately as the disease was eradicated, the ophthalmic affections permanently disappeared. Nyctalopia is a very common symptom of morbus maculosus Werlhofii, or the land scurvy, a disease we found, from some experience of it among our troops, to be totally different from that under consideration. In their symptoms, there is, in the early stages, a slight assimilation, but as they progress, in their pathological character they are perfectly dissimilar. Among the troops employed in Florida during the Seminole war, the morbus maculosus committed extensive ravages. Nyctalopia was a common symptom; some thirty cases of the disease occurring among the marine corps, co-operating with the army, were transferred from the field to the Marine Hospital at Washington then under our charge. These cases, as well as a number we witnessed at Point Isabel, in May, in the forces engaged under General Taylor, were totally distinct from the scurvy as it occurs on board ships at sea. Purpura, œdema, the cadaverous and fetid effluvium which follows the extreme emaciation, the fainting upon the slightest exertion, and the extent of disease in the respiratory and circulatory systems, which always occur in the scurvy on board ships, are never met with in the land scurvy. In the latter, we have sponginess of the gums, ulceration which terminates in dysenteries and fevers, the first induced by a cachectic diathesis, but never involving that complete anemia of the blood, which amounts to a universal septic tendency.

The symptoms of the disease, as they appeared on board the Raritan, varied materially from such as are laid down in books. Lassitude and indisposition to muscular energy were not among the symptoms which ushered in the disease; there were generally great activity and not unfrequently cheerfulness, good appetite and sound sleep at night, for weeks after the teeth were loosened, the gums ulcerated, the limbs œdematous and discolored. The nervous system was among the last to be invaded, and then it was not "an indisposition to corporeal exertion," but an actual disability. The countenance became pale, languid, cadaverous, the respiration oppressed, irregular, and the pulse, feeble, fluttering, intermittent, simultaneous with this muscular prostration. Slight efforts to turn, sit up, or move about, were followed by tremors and syncope. When this class of symptoms set in, the strides of the disease were rapid, everything indicating without speedy aid, an early fatal result.

In every case where the disease was so far advanced, the respiratory system was much involved. There was also a manifest reduction of the temperature of the body in every aggravated case. In two cases well-developed symptoms of angina pectoris presented, and the paroxysms were accompanied with the most distressing pains in the chest and arms. The patients themselves expressed the greatest apprehension of instant suffocation. Both these cases recovered from this angina, on their transfer to the hospital, but when we last saw them, their emaciated and tottering frames gave the incontestable evidence of permanently impaired constitutions.

There were but two classes of symptoms which made such irreparable

inroads on the constitution; from all the other symptoms the health became again perfectly restored; these were the oppressed, laborious and difficult respiration, the other irregular, obstructed and imperfect action of the heart. Paroxysms of dyspnœa were frequent in those cases; the inspirations were short and rapid, and performed chiefly by the action of the intercostal muscles, and were performed with much labour by the patient, imparting to the countenance the impression of suffocation, accompanied by palpitations which compelled the patient to sit up. The contractions and dilatations of the heart were irregular, at times intermitting and indistinct, with a great sense of anxiety in the precordia. In the midst of these symptoms the pulse was scarcely perceptible at the wrist, the extremities were cold, and the countenance assumed a leaden hue; auscultation, so far as practicable on board a crowded ship of war, gave us but little aid in detecting the character of organic derangement. In several cases the sounds emitted were those of hypertrophy; but the number of these cases were limited, compared with the indications of atrophy and diminution of the cardiac functions.

Febrile symptoms never supervened until after the development of these symptoms, involving the functions of the heart and lungs; after that, they were invariable. There were slight rigors or a mere coldness of the surface, in some cases, before the pyrexia developed itself. In most cases, even these were not observed. The pulse never became full and strong, but was small, frequent and corded, the skin warm and pungent (calor mordicans). The urine was small in quantity and high coloured. The bowels were readily influenced by small doses of aperients, the dejections being small and not unnatural.

The febrile paroxysms, which were always slight, assumed the character of double intermittents, there being two exacerbations and remissions within the twenty-four hours, and never were met with, as has been before observed, until the advanced periods of the disease. In this stage, fever rapidly assisted to exhaust the feeble forces still remaining, and notwithstanding it was so slight, that, in other conditions of the system, it could have produced but little injury, it here speedily prostrated the patient, from which prostration but few permanently recovered.

The fortunate arrival of the Raritan in Pensacola, at the very moment when the scurvy was putting on its most ghastly aspect, saved the lives of many, but left them for the future with impaired constitutions.

Sixty-four of these unfortunate cases, embracing most of our petty officers, were left in the hospital at Pensacola on our return to Vera Cruz, few of whom will ever again be restored to health and strength. A number of them, after lingering for months, we learn, died at the hospital, notwithstanding the possession of every comfort, and the zealous attentions of that distinguished physician and universally respected man, Dr. Hulse, the surgeon in charge.

In the enumeration of the symptoms of scurvy, it will be observed that they divide themselves into two distinct classes. While suffering from the first, the patients were able to eat their ration, or at least a portion of it, drank their grog, were lively, industrious and cheerful, and most unwilling to apply for medical treatment. This stage would last from several weeks to as many months, the disease being warded off by occasional small supplies of fruit, vegetables or fresh meat. In the second stage, cheerfulness and hope had fled, leaving pain and despair. Loathing of food, loss of rest,

inability (not disinclination) to stir or move without fainting, palpitations, and a sense of suffocation; while the rapid decay of the body, the cadaverous putrid odour, and the Hippocratic countenance, gave but too unfailing testimony of the near approach of death, unless relief was speedily obtained. On board the Falmouth, during her passage from Pensacola to Boston, Dr. Nelson informs us that cases of this character were numerous. In his own language, although he had selected the medical profession from his own choice, had studied and practiced it with pleasure, yet so loathsome and offensive were his duties among the sick and dying with scurvy, that the recurrence of similar scenes would drive him from the service.

From a large number of cases on our note-book, we will abridge three, as illustrating the various forms which the disease assumed. In the first, œdema, effusions and petechiæ terminating in ulcerations, occurred; in the second, universal purpura of the inferior extremities, terminating in dry gangrene; in the third, the lungs and heart were invaded in the worst form, from which the patient was for a time revived, but the case ultimately terminated in death.

Case I.—Edward Brandis, musician, aged 45, of a robust and sanguine temperament, had been in uninterrupted good health for more than two years, was admitted on the sick report on the 29th of June. When off Point Isabel, in May, first experienced scorbutic symptoms, œdema of the feet and ankles, which disappeared on an acid treatment, with occasional use of fresh animal food. Within the last few weeks, this effusion again returned, and is now so extensive as to interfere with his walking about deck. The feet, ankles and legs are greatly distended with a puffiness and fullness about the eyes, showing a disposition to anasarca. The arms and legs are covered with numerous petechiæ, resembling flea-bites; many on the legs are opened or covered with a small scab, produced by the patient's rubbing and irritating them. His general health never was better; his appetite is good, sleeps well, and is of a most cheerful and contented disposition. He says, that he is heavier in flesh at present than he has ever been before, weighing nearly two hundred, with all the activity and strength of his youth. The gums are but slightly affected; and give him no inconvenience.

By the 5th of July, the symptoms had all increased in severity; the effusion was more extensive, and the ulcerations of the petechiæ increasing in extent, with a more copious discharge. On the 10th, the progress of the disease was still more obvious, although he had been on the shore on the 6th and 7th, with the parties employed in watering ship at San Martin. He passed both these days much to his delight, bathing in a pleasant mountain stream, which he felt convinced would cure him. In this he was much disappointed, as severe pains in the muscles and bones were felt for the first time after these bathings. Day after day, the effusions in the extremities continued to augment; the ulcers became more extensive and more numerous, with indolent, unhealthy surfaces, discharging freely. The pains in the legs increased to such a degree, that the patient was only able to move after much exertion. This increase of the symptoms, for which he was admitted on the sick report, was not followed by any involving other organs. Digestion continued good; the respiration was unaffected; he was able to make the strongest exertions in playing upon wind instruments, while the pulse and heart continued normal. In this condition he was transferred to the hospital on the 25th of July, with his legs enor-

mously enlarged, and covered with troublesome ulcers. His spirits never flagged, and he never was more cheerful. At the hospital, as on board, he continued to amuse his fellow patients, the officers and their friends, with his guitar, on which he excelled. The transfer to the hospital, where all were abundantly supplied with everything they so much required, was followed by a speedy convalescence.

While still in a debilitated condition, Brandis, like a majority of his shipmates at the hospital, no sooner was freed from the scurvy than he was seized with the epidemic (pernicious fever) which raged so severely at Pensacola during the past summer. He, however, ultimately recovered.

Case II.—Birdsy Curtis, holder, aged 26, tall and slender, of a lymphatic temperament, had been stationed for many months in the ship's hold, where, in consequence of being deprived of light and air, he had become blanched and etiolated. His constitution had never been robust, yet he had enjoyed good health throughout our cruize on the coast of Brazil. He reported himself sick on the 5th of July, at the time presenting a most miserable and exhausted aspect. He was much emaciated, and for several weeks had been bleeding freely from the gums, most of his teeth being loosened. He declined to report himself as sick earlier, as he expected the ship would proceed to port, and he felt sufficiently well to assist at his duties. Upon examination, his legs were found discoloured on the inside from the knees to the toes; the muscles were almost completely wasted away; his gait was weak and tottering. Severe pains in the muscles and bones racked every part of his frame; his breathing was oppressed and difficult, pulse small, soft and intermitting, and the temperature of the whole body some degrees below the healthy standard. The discoloration extended round the leg, and along the whole length of the inside of the thighs, while it also assumed a darker hue, enveloping toes, feet and legs, as perfectly as a stocking, after the lapse of a few days. The prostration and inability to move also increased, and by the 12th, he was unable to leave his cot. Purpura now appeared on the inside of the arms; the gums were deeply ulcerated, breath fetid, eyes sunken, and countenance ghastly. Respiration was attended with severe pain in the chest, and oppression. The pulse became more feeble and shattered, while a slight but constant irritative fever rapidly contributed to exhaust the patient. The toes and feet were now the first to put on the form of dry gangrene. They became hard, immovable, cold and black. This appearance extended daily, accompanied with much pain, until the ankles, legs and knees of both sides were involved. So rapid was its progress, that it had reached this extent on the 14th of the month. Skin, cellular tissue, muscles, tendons and ligaments had all simultaneously assumed the hardness and sensation to the touch of wood, at the same time that they were cold and black. The irritative fever could not be subdued, while the pains, ulcerations, exhaustion and fetor, indicated certain and speedy dissolution.

On the 15th, Curtis was transferred, with much suffering, to the steamer Princeton, bound to Pensacola. On board the Princeton, fresh provisions were comparatively abundant. Meats, fruits and vegetables were used externally and internally, which kept the miserable sufferer alive until his arrival at Pensacola, after a short passage of four days. He was immediately landed, and while being carried from the landing to the hospital, he fainted in his cot; those in charge of him believed him dead. For some days after his arrival, it was doubtful whether he would live from day to

day. Milk, acids and fruits were freely administered, while his blackened and insensible legs were frequently rubbed with lime juice, and enveloped in scraped raw potatoes.

After the sixth day, the irritative fever began to subside, the pain and difficult respiration abated, while the pulse became more natural. This improvement was slow; at the end of three weeks, he was able to take food with some appetite, was free from pain when kept quiet, and slept soundly at night. His gums ceased to bleed, and the fetor from mouth and body had disappeared. From this time he continued gradually to improve, but not with rapidity. Six weeks after his admission into the hospital, when I last saw him, his toes and feet, with the integuments and muscles as high as the knees, still retained the hardness and sensation to the touch of wood. He was then able to move about his ward with the aid of crutches, while the deep-seated muscles and tendons moved in their indurated envelopes of hardened tissues, without producing the slightest fold or wrinkle, just as the foot moves in a wooden shoe. He was then cheerful and improving, but when last heard from, he had not sufficiently recovered to accept his discharge, although more than three months had elapsed.

Case III.—Robert Emmett, seaman, aged 30, had suffered from soreness and bleeding of the gums for six weeks, before he was disabled from performing his duty. On the 28th September, was admitted upon the sick report, suffering from the most severe pain in the chest, accompanied with a sense of suffocation, unless elevated. The action of the heart was turbulent and oppressed, with an expression of the countenance apprehensive of immediate suffocation. The surface and extremities were cold, with a pulse scarcely perceptible.

Up to the period of his admission, he had enjoyed excellent health, felt well and cheerful; there were no macula, discolorations, effusions or pains in the extremities. His digestive and assimilative organs were apparently unimpaired; the only evidence exhibited of any morbid action going on in the system, was confined to the slight tenderness of the gums, which were not sufficiently severe to oblige him to apply for assistance. On this day he had been taken suddenly so ill, that he was incapable of making any exertion; the symptoms were not unlike those we meet with in the last stages of pneumonia combined with pulmonary congestion. On the second day, all the symptoms were more aggravated; the gums were ulcerated and offensive, the teeth loose, the countenance more haggard and distressed, while the respiration was short, hurried, and laborious. At times there were severe palpitations of the heart, while its actions were intermittent and irregular. The skin was cold, clammy and exsanguious, without any tendency to ulcerate or discolour. The necessary efforts to move in his cot, occasioned severe pain in his extremities, accompanied by exhaustion or a disposition to syncope. The seat of his greatest suffering was in the chest. There was not the acute pain which indicates pleuritis or recent pneumonia, but a sense of weight and constriction which appeared to threaten suffocation, and which gave to the features the expression of great fear and anxiety. There was great loathing or inability to take food or drinks, with constipation, and a small secretion of high-coloured urine.

He continued to sink rapidly, with exhaustion upon the slightest efforts, while the breath became more offensive, and the expression more cadaverous. The muscles and integuments on the lower extremities now assumed

a more unnatural appearance; they felt cold, clammy and doughy. Upon being pressed aside or pitted, they did not again return to their natural position. This was not owing to effusion, but to a change in texture or vitality in the parts, which had deprived them of their natural elasticity. The skin and muscles looked as though ready to drop from the bones. In this condition he was transferred to the hospital, where, by diligent, careful and able professional attention, after much suffering, there was some improvement. His limbs were kept enveloped in fresh vegetable acids, while those articles most required were administered at frequent and short intervals. With much nursing his life was prolonged, but he never recovered. When improving, his indulgence brought on a severe attack of disease under which he died.

Cause.—The preceding history of the scurvy on board the Raritan, renders the cause of the appearance and extension of the disease on board that ship sufficiently obvious. It was there shown, that the hold and berth deck were imperfectly ventilated, during two years' cruizing between the tropics. The ship was kept much of her time in ports, where fresh meats and vegetables could not be procured, while upon her South American cruize, and after her period of service had terminated, when the time for which most of her crew had shipped had expired, a second still more arduous duty devolved upon the crew, in consequence of our being involved in a war. During a period of three hundred days, the ship's company of the Raritan had fresh meats served to them but nineteen times, and then, with but a small quantity of indifferent vegetables. The occurrence of scurvy, under these circumstances, in a warm climate, where the crew were frequently exercised at their guns, with at times on allowance of water, was not a subject of surprise. It is, indeed, more surprising, that the disease did not manifest itself sooner, and that there were not more fatal cases. Its long latent condition, the few fatal cases, and the speed with which it was eradicated from the ship, were all owing to the regularity of living and the police which are enforced on board ships of war. The same disease, under the same circumstances, on the crowded decks of merchant ships, between the tropics, would doubtless have assumed a dreadful form. Our merchant whaling ships are the only vessels in which scurvy prevails to any extent at the present day. These ships continue for many months at sea, and when in port to refit, remain but a short time. In many there is but little regard for personal cleanliness, and the ships are frequently very offensive. On board these whale ships, we have seen scurvy in its worst forms, but it always occurred in vessels where their universal anti-scorbutic, fresh potatoes, had been exhausted for some time. So long as these lasted, the disease never made its appearance.

Salt beef and pork, which constitute a portion of the daily ration of the seamen at sea, when long preserved, lose their nutritive qualities, and in proportion to the time they are kept, become unwholesome and innutritious. The navy being furnished with these articles by contract, they are often long kept, and nearly spoiled before they are served out. When new beef and pork are delivered to the government, in a sound and wholesome state, they are carefully stowed away until the old stock on hand is consumed; by which time, the new has reached the same condition as that which was nearly in a state to be condemned, if surveyed. The crews of our ships abroad are thus almost constantly eating old provisions, an evil which can-

not be well avoided, unless, by the more abundant supply of fresh meats on all foreign stations.

The recent change in the navy ration, which furnishes salt meat every day in the week, instead of allowing one day, as heretofore, in which no animal food was served out, has apparently increased the disposition to scurvy on board our ships of war. Agreeably to the last accounts from the East India squadron, the scurvy had made its appearance on board the U. S. ship Columbus, then at the Sandwich Islands. We served on that station and in the Pacific some years ago, under the former ration law, when on Fridays, sailors lived upon vegetables alone, and although the ship to which we were attached was eleven months out of thirteen, actually under way at sea, yet the scurvy did not make its appearance. It is a most useful regulation on board ship, to have vegetables alone served to all hands at least one day in the week.

The appearance of scurvy among the crew of the Potomac recently placed in commission, with an excellent police on board, would be a subject of surprise to those not familiar with the circumstances which led to it. We served for three years on board that ship, at sea, and consequently know her well. In every respect is she a sister ship to the Raritan. In tonnage and in the internal arrangements, by which the berth deck and hold are very low and imperfectly ventilated, they are precisely similar. The apartments of the officers are small, without light, and with very small hatches communicating between the berth and gun decks.

From the day of sailing from the dock-yard, up to the time of her arrival in Pensacola with the scurvy on board, salt provisions only were served out, and both the beef and pork had been long kept before using. The beef particularly was much deteriorated, and much of it, as was also the case on board the Raritan, was condemned by a survey of a board of officers, as unfit for use. Dr. Dodd, the experienced surgeon of the Potomac, attributed the unwholesome, indigestible qualities of the meats on board the P. to the quality of the salt used in the curing of the meats; a subject to which no attention has heretofore been directed, and the great importance of which must be obvious to all. It is to be hoped that in furnishing supplies, this will be attended to by the inspecting officers.

The Falmouth, corvette, on which the scurvy appeared with so much severity, had been two years in commission, and the ship herself, as well as the crew, became diseased by long exposure to hot weather, cruizing between the tropics. In this respect the Falmouth and Raritan were similarly situated; both ships had been long at sea, exposed to a burning sun, with their ships' company long confined to salt provisions, while the ships' holds had not been thoroughly broken out and ventilated. Our ships of war in this respect labour under many disadvantages. A merchant vessel is broken out to the kelson, thoroughly cleaned and ventilated every time she enters port, while this cannot be perfectly done in our public ships, until the termination of her cruize of three years. The causes of scurvy in the squadron employed in the blockade of the Mexican ports in the Gulf, during the past summer, may all be summed up in a few words. Protracted cruizing between the tropics, unwholesome and innutritious salt provisions, vitiated atmosphere on board resulting from imperfect ventilation; at times, a reduction in the quantity of water; and, in the crew of the Raritan, the despondency and disappointment resulting from being kept on board ship after the expiration of the period for which many of the crew had shipped.

Pathology.—The humeral pathologists, in placing the primary seat of this disease in the changed condition of the blood, on which the subsequent morbid change of the solids is dependent, come nearest, in our opinion, to a correct view of the pathology of this disease. The only careful analysis of the blood of scorbutic patients, that has fallen under our notice, is that of Dr. Busk, the surgeon of the Dreadnought Hospital ship, moored off Greenwich Hospital, and where more recent cases of diseases among seamen are treated than in any other institution. This liberal charity is free for the admission of sick seamen from all nations, and is supported entirely by private donations. During a visit on board, several years since, we found a number of American seamen comfortably provided for. Almost every government of Europe, we learned, was among its contributors, even those without a marine, while the United States, the citizens of which are constantly receiving its benefits, does not contribute towards its support. On the occasion of our visit, cases of scorbutus were under treatment, and among them were two terminating in dry gangrene of the lower extremities, analogous cases to that of Curtis, detailed above. The analysis of the blood, made from three well-marked cases brought for treatment to the Dreadnought, is as represented in the following table.

	1	2	3	Healthy blood.
Water - - - -	849·9	835·9	846·2	788·8
Solid constituents - -	150·1	164·1	153·8	211·2
Fibrin - - - -	6·5	4·5	5·9	3·3
Albumen - - - -	84·0	76·6	74·2	67·2
Blood corpuscles - -	87·8	72·3	60·7	133·7
Salts - - - -	9·7	11·5	10·9	6·8

"These analyses are sufficient to disprove the general notion that in this disease the corpuscles are dissolved in the serum. In the blood taken from these scorbutic patients, the separation into serum and clot was as perfect, and took place as rapidly, as in healthy blood. In two of the cases, the clot was buffed and cupped."

The observations made on the blood on board the Raritan corroborate the above experiments, the separation of the blood into clot and serum being rapid and perfect; but the clot was small.*

Animal chemistry promises not only to reveal the true nature of this disease, as well as of many others, but also to furnish us with means to guard against it, and effectually to remove it after it does occur. Liebig and Simon have clearly proved, that, when the oxides of protein predominate in the blood, or that when they accumulate in any part of the system, that general or local inflammations are the certain results. The false membranes which form on the mucous and serous surfaces, are found by analysis to be composed of oxidized protein. Inflammation is combated by endeavouring to diminish the quantity of tritoxide of protein, and to hinder its formation in the lungs. Venesection and purgatives have this effect, and hence their efficiency in the treatment of inflammatory diseases. An opposite condition of the blood obtains in scurvy.

Spanæmia or poverty of the blood, in which the amount of fibrin and of

[* These observations are further confirmed by the recent analyses of scorbutic blood by MM. Becquerel and Rodier, and by M. Andral. The blood, in these cases, so far from presenting the state of dissolution usually described, coagulated firmly, and the fibrin was found generally to exceed the physiological mean, never to fall below it. See *Quarterly Summary* of this Number.—Editor.]

corpuscles is diminished, while the proportion of water is higher than in the healthy state, is the condition in which the blood is found in this disease. The impropriety of blood-letting under those conditions is so great, that venesection must be carefully avoided, and but few opportunities are thus offered for an investigation and analysis of that fluid.

Protein is the basis of albumen, fibrin, casein, and these are the commencement or starting points of all the tissues, and this, the basis of the three aforesaid animal principles, may be obtained from similar elements in the vegetable kingdom.

Liebig observes: "As far as our researches have gone, it may be laid down as a law, founded on experience, that vegetables produce in their organism, compounds of protein, and that out of these compounds of protein, the various tissues and parts of the animal body are developed by the vital force, with the aid of the oxygen of the atmosphere, and of the elements of water."

Highly proteinized vegetables are the principal food of herbivorous animals, and in proportion as the plants contain this ingredient, are they nutritious. The products of these vegetables are identical with the constituents of the blood, and the blood of animals, chemistry has demonstrated, is formed from these substances. When, therefore, we find men compelled to subsist for a long period upon animal food almost exclusively, which is destitute of protein, scurvy will be found to be one of the forms of disease which this imperfect nutrition will induce.

"Those vegetable principles, which, in animals, are used to form blood, contain the chief constituents of blood, fibrin and albumen ready formed, as far as regards their composition; all plants besides contain a certain quantity of iron, which reappears in the colouring matter of the blood. Vegetable fibrin and animal fibrin, vegetable albumen and animal albumen, hardly differ even in form; if these principles are wanting in the food, the nutrition of the animal is arrested."—(*Liebig.*) This was the case with the seamen who suffered from scurvy in the fleet, during the past summer.

The whole condition of the scorbutic patients clearly proved that the morbid actions were going on in the blood. The extensive ecchymoses, purpuræ, and petechiæ, the rapid tendency to ulceration in all parts of the body, the diminished quantity, high colour and tendency to speedy decomposition of the urine, all evince that the blood is the seat of the pathological changes going on.

To the general received opinion, that the primary cause of the disease is in a deranged condition of the chylopoietic function, we cannot concur. In the vast number of cases which came under our immediate notice, there were but few that exhibited symptoms of disease in the digestive organs. In a disease where the process of sanguification is so much involved, we might expect there would be much derangement in the organs of chymification. Such, however, is not the case, excepting so far as they are deranged by the long application of innutritious food. In the worst cases, the digestive and assimilative organs retained their vigour and activity, after the nervous, circulatory and respiratory systems were prostrate. To this unimpaired condition of the digestive organs, may be attributed the recovery of many cases after our return to port, where, had there been any disease in those organs, all hopes of restoration would have been fruitless.

Treatment.—The mild cases of the disease which first presented, were

all relieved by a course of acidulated drinks. The citric and tartaric acids were ordered for this purpose, and the small quantities of fruits which were occasionally procured from shore, were distributed among the patients, and always with benefit. The rheumatism with which the disease was at its first appearance frequently associated, received the usual treatment, with but little or no alleviation, except from the severe nocturnal pains which were frequently soothed by morphia and opium, and the acidulated drinks and fruits.

Lime juice, citric, tartaric and acetic acids, were freely administered, but the number of cases requiring these articles became so great, that the usual supplies on board were soon exhausted. The small quantities of fresh vegetables and fruits, in the officers' messes, were presented to the medical department for the use of the sick, of which the largest quantity on board the Raritan came from the cabin. At one time a liberal supply of potatoes and onions was procured, which were given raw to the sick, and no articles prescribed exerted a salutary effect so promptly as potatoes in an uncooked state. On board our large fleet of whale ships, raw potatoes are served out daily, and they are found so efficacious that they constitute almost the only anti-scorbutic carried out by them. Whenever we could procure even a small supply, the improvement in the sick was too obvious not to prove their superiority to all other remedies administered. It might be supposed that, when cooked, they would be equally efficacious, but such was not the case.

The basis of the potato is starch, and from the facility with which it is transferred into healthy nutritious matter, we may expect some of the same salutary effects from the use of starch itself, in the treatment of scurvy. Starch, indeed, in conjunction with lime juice, we should judge from their elements, and the known condition of the constituents of the blood, would be highly efficacious, if not a specific, in the treatment of this disease. We trust that at the first opportunity which may present to our medical *confrères* in the service, that the efficacy of starch, in conjunction with lime-juice, may be freely tested. Of its success we are sanguine.

Numerous well authenticated instances are on record proving that the long boasted specifics, lime and lemon juice, will not in every instance prove effectual. On board her majesty's ship Leander, the scurvy prevailed to a frightful extent, although lemon juice was plentifully administered during all of her passage from Trincomalee to the Cape of Good Hope. Yet to the introduction of lemon juice as a portion of the seaman's ration, as early as 1795, must be attributed the almost complete extinction of this scourge of the sea, from the British Navy. Before that period, the existence of this disease on board ships performing long voyages, was universal. The destructive ravages of this disorder are awfully and vividly portrayed in the narratives of the early English navigators, particularly in those of Sir Francis Drake, Davis, and Cavendish. Lord Anson, in the course of his voyage round the world, lost more than four-fifths of his officers and men. Sir Richard Hawkins remarks, that within his own naval experience, he had known more than ten thousand men perish by the scurvy. Prior to the year 1796, more sailors, it is believed, fell victims to this scourge, than to the united consequences of naval warfare, and the various accidents incidental to a maritime life. These evils all disappeared for a time, upon the universal introduction of lemon juice; but it would appear, from the recent history of the French, English, and our own marine, that the disease will still at times assume the same intensity with which it formerly raged. This may

be owing to less care in enforcing the necessary precautions, or to the protracted cruising and arduous duties, which must occasionally, from the nature of the service, devolve upon particular ships, and which, in a time of war, cannot be obviated. In such cases we must ward off the evil as long as possible, and when it is upon us, without delay resort to such means as we know will prove effectual.

What years of experience have proved to be so serviceable, lemon juices and vegetables, analytical chemistry now comes with her discoveries, and proves to contain just such elements as the body is deficient in. The discovery of protein in vegetables alone, and the part it performs in nutrition, only confirm, like all other important discoveries, the simplicity and the harmony of all the operations of nature.

All the remedies administered for the treatment of scurvy on board the ships in the Gulf, were only palliative. A change of food, abundant supplies of water and pure air, were indispensable for a perfect eradication of disease, and these were not obtained until after our arrival in Pensacola. When the Raritan suffered most, and when most of the articles adapted to the treatment had been expended, the commanders of the English and French squadrons off Vera Cruz very kindly assisted to procure a liberal supply of limes and lemons, with some fresh meats, which proved most seasonable, and materially meliorated the disease, and in some instances saved the lives of the sick. For these kind and seasonable attentions, we take this occasion to return our grateful acknowledgments.

The Raritan arrived at Pensacola on the 24th of July, and from that date the administration of all medicines may be said to have ceased. Fresh meats, fresh bread, potatoes and onions, were served out to all who remained on board. Eighty-four of the worst cases were transferred to the hospital, where acids from the recent fruits, with milk, were administered to the worst cases, while such as were able were placed upon a more substantial diet. In many of the worst cases, the improvement was slow. Many of the scorbutic patients, when convalescent, were seized with the epidemic fever, which raged with great severity at that port during the past autumn; while others were prostrated with autumnal intermittents of an obstinate character, which resisted all treatment until the appearance of cold weather.

The whole treatment of sea scurvy may be summed up in a few words. Supply the system freely with protein, by giving patients freely those vegetables in which it most abounds. Many English naval surgeons maintain that vegetable acids alone are not sufficient to cure scurvy, and that a portion of fresh animal food is necessary for a cure. In the first part of the opinion we cannot concur, and although fresh animal food will accelerate a cure, and should always be resorted to when it can be procured, yet the vegetables are all that are necessary in such cases; and where the fruits and vegetables in a recent state cannot be obtained, starch and lemon juice, both of which can be carried at sea in sufficient quantities, will give us all that is required for the prevention and cure of scurvy on board ships, when combined with cleanliness, ventilation, abundance of water and cheerfulness. Where there are mental despondency, dejection and disappointment in a crew suffering from scurvy, as was the case with that portion of our crew whose period of service had expired, almost every effort to restore the health, so long as these depressing passions continue in operation, will be unavailing. The humane physician and the prudent commander would in such cases recommend a discharge of the crew, and a run on shore.